What is claimed is:

1	1. A wafer testing device comprising:
2	a. An at least five motion axis computer numeric controlled wafer handling
3	system having:
4	i. at least one linear precision axis;
5	ii. one handling rotation axis;
6	iii. one vertical gross positioning linear axis;
7	iv. one vertical dual position axis.
8	Wherein said linear precision movement axis are provided by a linear
9	precision stage combined with a chuck for receiving and positioning said
10	wafer for said optical wafer testing, said linear precision stage having a travel
11	of about the diameter of said wafer and having a positioning accuracy required
12	by a measurement process employed by the wafer testing device;
13	wherein said rotation axis is provided by a robotic single axis system
14	combined with said linear precision stage in a fixed position relative to a
15	center axis of said chuck, said robotic arm system including an effector having
16	a shaft substantially concentric with said rotation axis and having a distal
17	carrying face, said shaft being immediately adjacent said chuck and rotating
18	said effector between a chuck loading orientation and an elevator alignment
19	orientation, wherein during said chuck loading orientation said carrying face
20	being substantially concentric with said center axis;
21	wherein said gross positioning axis is provided by an elevator configured for
22	vertically moving a substantially vertically arranged cassette and prealigner
23	such that while said effector is in said elevator alignment orientation said
24	effector may be alternating moved by said linear precision stage in between a
25	number of wafer stacking levels of said cassette to the point where the
26	carrying face is interfering with a wafer stacking axis and into said prealigner
27	with said carrying face interfering with a prealigner operating axis;
28	wherein said dual positioning axis is provided by pinlifters having a top
29	position in which top faces of said pinlifters are above said carrying face and a

30	bottom position in which said top faces are below a wafer holding face of said
31	chuck such that said wafer may be moved between said wafer holding face
32	and said top position and such that said wafer may be loaded and unloaded
33	from said carrying face while said effector is in said chuck loading position;
34	and
35	wherein said carrying face is placed on a tangential distal portion of said
36	effector such that said carrying face is rotated into and out of said chuck
37	loading orientation in which said carrying face interferes with a chuck center
38	axis without colliding of the effector with said pin lifters being in said top
39	position.
10	
1	2. The wafer testing device of claim 1, further comprising:
2	a. a configuration for testing a wafer with a diameter of about 300mm;
3	and
4	b. a head clearance of about 1.25 inches plus a wafer height of about
5	0.75mm.
6	
1	3. The wafer testing device of claim 1, further comprising:
2	a. a second linear precision stage substantially perpendicular to said
3	linear precision stage; and
4	b. a virtual loading axis having a loading travel that is substantially the
5	square root of the sums of each of the stage's travel square.
6	
1	4. A wafer handling system comprising:
2	a. at least one horizontal linear precision axis;
3	b. one handling rotation axis;
4	c. one vertical gross positioning linear axis;
5	d. one vertical dual position axis;
6	Wherein said linear precision movement axis are provided by a linear
7	precision stage combined with a chuck for receiving and positioning said

wafer for said optical wafer testing, said linear precision stage having a travel

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of about the diameter of said wafer and having a positioning accuracy required 9 10 by a measurement process employed by the wafer testing device; 11 wherein said rotation axis is provided by a robotic single axis system 12 combined with said linear precision stage in a fixed position relative to a center axis of said chuck, said robotic arm system including an effector having 13 14 a shaft substantially concentric with said rotation axis and having a distal 15 carrying face, said shaft being immediately adjacent said chuck and rotating said effector between a chuck loading orientation and an elevator alignment 16 17 orientation, wherein during said chuck loading orientation said carrying face 18 being substantially concentric with said center axis; wherein said gross positioning axis is provided by an elevator configured for 19 vertically moving a substantially vertically arranged cassette and prealigner 20 21 such that while said effector is in said elevator alignment orientation said effector may be alternating moved by said linear precision stage in between a 22 23 number of wafer stacking levels of said cassette to the point where the carrying face is interfering with a wafer stacking axis and into said prealigner 24 with said carrying face interfering with a prealigner operating axis: 25 wherein said dual positioning axis is provided by pinlifters having a top 26 27 position in which top faces of said pinlifters are above said carrying face and a 28 bottom position in which said top faces are below a wafer holding face of said 29 chuck such that said wafer may be moved between said wafer holding face and said top position and such that said wafer may be loaded and unloaded 30 from said carrying face while said effector is in said chuck loading position; 31 32 and 33 wherein said carrying face is placed on a tangential distal portion of said 34 effector such that said carrying face is rotated into and out of said chuck 35 loading orientation in which said carrying face interferes with a chuck center axis without colliding of the effector with said pin lifters being in said top 36 37 position. 38

5. The wafer handling system of claim 4, further comprising:

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2	a. a second finear precision stage substantially perpendicular to said
3	linear precision stage; and
4	b. a virtual loading axis having a loading travel that is substantially the
5	square root of the sums of each of the stage's travel square.
6	
1	6. A robotic single axis system comprising:
2	a. an assembly plate having a central cutout arc for attaching said robotic
3	single axis system to a stage system substantially concentric to a chuck of said
4	stage system;
5	b. controlled motor attached to said assembly plate and embedded within
6	lateral boundaries of said assembly plate;
7	c. an effector having:
8	i. a rotatable mounted shaft rotatable attached to said assembly plate
9	and embedded within said lateral boundaries of said assembly
0	plate;
1	ii. a radial arm portion;
12	iii. a tangential arm portion at a distal end of said radial arm portion;
13	iv. a vacuum actuated carrying face at said tangential arm, said
14	carrying face being configured for fixedly holding a wafer while
15	said wafer is snuggly contacting said carrying face and while a
16	vacuum is applied;
17	v. an internal vacuum line between said carrying face and a non
18	rotating hub adjacent said shaft for applying said vacuum to said
19	carrying face via said hub;
20	wherein said radial arm portion and said tangential arm portion are
21	such that said effector fits within said lateral boundaries of said
22	assembly plate while said effector is in a parking position;
23	d. a reduction gear coupling said motor and said shaft while reducing a
24	rotational speed of said motor into an angular speed of said effector, said
25	reduction gear being attached to said assembly plate and embedded within
26	said lateral boundaries of said assembly plate;

27		e. a rotation sensor for recognizing at least one of an angular orientation and
28		a rotational speed of at least one of said effector and said motor, said
29		rotation sensor being attached to said assembly plate and embedded within
30		lateral boundaries of said assembly plate; and
31		f. a vacuum actuation means for actuating a vacuum at said hub, said
32		vacuum actuation means being embedded within lateral boundaries of said
33		assembly plate.
34		
1	7.	The robotic single axis system of claim 6, wherein said lateral boundaries fit
2		within a concentric envelop of a chuck for carrying a wafer having a diameter
3		of about 300mm diameter, said concentric envelop having a diameter of
4		maximum about 21 inches with said effector being in parking position.
5		
1	8. A	wafer effector comprising:
2		c. a rotatable mounted shaft;
3		d. a radial arm portion;
4		e. a tangential arm portion at a distal end of said radial arm portion;
5		f. a vacuum actuated carrying face at said tangential arm portion, said
6		carrying face being configured for fixedly holding a wafer while said
7		wafer is snuggly contacting said carrying face and while a vacuum is
8		applied; and
9		g. a vacuum line between said carrying face and a non rotating hub adjacent

said shaft for applying said vacuum to said carrying face via said hub.

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